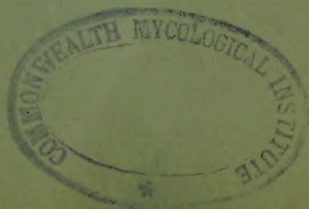

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PRELIMINARY LIST OF IOWA UREDINEÆ

AND

MEMORANDUM OF IOWA USTILAGINEÆ.

BY J. C. ARTHUR.



PRELIMINARY LIST OF IOWA UREDINEÆ.

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A sufficiently large number of species of *Uredineæ* have been collected in the state to make it desirable that a list be published, in order that collectors may know what has been and what has not been found. The list already seems long, but it is, however, very far from being complete. It is based upon the collection in the herbarium of the Iowa Agricultural College, supplemented by the collection of the writer. Every locality cited is represented by a specimen, which may be the subject of further study at any time.

The determination of many of the species has been rendered troublesome by the lack of good material showing the uredo stage, and by neglect to procure evidences at the time of collection by which the host can be accurately determined. Especially is this the case among grasses and sedges, and collectors cannot be too careful about these points. Some fragments of flowers, seeds, or inflorescence may usually be found, if not perfect ones, and should always accompany the specimens. Teleutospores on grasses and sedges may often be found during the winter, and are particularly valuable to show the perfectly mature state of the species. In cases where no uredo is ever produced it is as important to establish the fact as in other cases to collect the uredo.

The alphabetical classification adopted for the present paper is necessitated by a lack of knowledge of the relationships of the American species. In the first place observations and material are not sufficiently complete, as has been partially indicated above, and then there is need of some experimental knowledge, which can only be obtained by means of cultures. There is no reason why any acute observer who possesses a microscope may not be entirely successful in this line of research, which requires no special apparatus or facilities of any kind. It is an attractive field that ought to be cultivated.

All the æcidia have been placed by themselves, with the exception of those belonging to *Phragmidium*, for the sake of uniformity, for although a few may be distributed to their respective teleutosporic forms with entire confidence, the majority must await the decision of experimental tests. The æcidia of *Phragmidium* are often mistaken for uredo, but can be easily distinguished under the

microscope by the æcidiaspores being in chains of three or more, while the uredospores are borne singly on pedicels.

I am very deeply indebted to Professor C. E. Bessey, who has given me the use of the collections belonging to the college herbarium, and also of his own, and to Mr. E. W. Holway who has furnished material for a very large part of the work, including many interesting forms often overlooked by collectors, and has otherwise given much assistance.

All the specimens from Decorah were collected by Mr. Holway, the larger part of those from Ames by Professor Bessey, and part of those from Ames and all from Charles City and Spirit Lake by the writer. The localities are mentioned in the order in which specimens were communicated.

1. UROMYCES ACUMINATUS Arth. Bull. Minn. Acad. Nat. Sci., II.
 II. On *Spartina cynosuroides* Willd. Spirit Lake, Decorah, Ames.
 III. On *S. cynosuroides* Willd. Ft. Dodge, Decorah, Spirit Lake, Ames.
2. UROM. APICULATUS Lev. Ann. Sci. Nat. Ser., 3, VIII, p. 375.
 II. On *Trifolium repens* L. Decorah.
 • III. On *T. repens* L. Decorah.
3. UROM. BRANDEGI Pk. Bot. Gaz., IV, p. 127.
 III. On *Bouteloua racemosa* Lag. Decorah, Ames, Spirit Lake.

It is the opinion of Dr. Farlow (Proc. Am. Acad., XVIII, p. 82) that this is only a of state *Puccinia vexans*, possibly the uredo form, but until the matter is demonstrated it is best to retain the name. Specimens of rust on *Bouteloua*, collected at Spirit Lake in March of this year were entirely free from the one-celled form, and therefore give a little additional evidence in favor of Dr. Farlow's views.

5. UROM. CALADII (Schw.) Uredo caladii Schw., Syn. Fung. Car. Sup. No. 480.
 III. On *Arisæma triphyllum* Torr. Decorah.
5. UROM. ERYTHRONII (DC.) Wint. Kryp. Fl. v. Deutschl., I, p. 149. (*U. liliacearum* Unger.)
 II. On *Lilium superbum* L. Decorah.
 III. On *L. superbum* L. Decorah.
6. UROM. EUPHORBIE (Schw.) Uredo euphorbiæ Schw. Syn. Fung. Car. Sup., No. 459

- II. { On *Euphorbia glyptosperma* Engelm. Charles City.
On *E. heterophylla* L. Charles City.
On *E. hypericifolia* L. Ames.
On *E. maculata* L. Ames.
- III. { On *E. glyptosperma* Engelm. Charles City, Spirit Lake.
On *E. maculata* L. Decorah, Ames.
On *E. hypericifolia* L. Ames.
On *E. heterophylla* L. Charles City, Decorah.
7. UROM. EUPHORBIÆ (Schw.) var. MINOR Arth. Bull. Minn. Acad. Nat. Sci., II.
III. On *Euphorbia marginata* Pursh. Ames.
8. UROM. HEDYSARI-PANICULATI (Schw.) Puccinia *hedysari-paniculati* Schw., Syn. Fung. Car. Sup., No. 503. (Urom. *solida* B. & C.)
III. On *Desmodium sessilifolium* T. & G. Ames.
9. UROM. HOWEI Peck. 30th Rep. N. Y. St. Mus., p. 75.
III. { On *Asclepias cornuti* Dec. Ames, Decorah.
On *A. tuberosa* L. Decorah.
On *A. incarnata* L. Decorah.
10. UROM. HYPERICI-FRONDOSI (Schw) Arth. Bull. Minn. Acad. Nat. Sci., II. (II.—*Trichobasis hyperici* Gerard.)
III. On *Hypericum pyramidatum* Ait. Ames, Decorah.
11. UROM. JUNCII Tul. Ann. Sci. Nat., Ser., 4. II.
II. On *Juncus tenuis* Willd. Ames.
III. On *J. tenuis* Willd. Ames.
12. UROM. LESPEDZÆ (Schw.) Pk. 29th Rep. N. Y. St. Mus., p. 68. (II. — *Uredo lespedeziæ* Thm.)
II. On *Lespedeza capitata* Michx. Ames, Charles City.
III. { On *L. capitata* Michx. Charles City, Ames, Decorah.
On *L. leptostachya* Engelm. Lyon Co., Ft. Dodge, Ames, Emmet Co., Decorah.
13. UROM. PHASEOLI (Pers.) Wint. Kryp, Fl. v. Deutschl., I, p. 157.
III. On *Phaseolus diversifolius* Pers. Ames.
14. UROM. POLYGONI (Pers.) Wint. Kryp. Fl. v. Deutschl., I, p. 154.
III. { On *Polygonum aviculare* L. Ames.
On *P. erectum* L. Charles City.

15. UROMORBI (Pers.) Wint. Krypt. Fl. v. Deutschl., I, p. 158.
(U polymorphus P & C.)
II. On *Vicia americana* Muhl. Ames.
III. { On *V. americana* Muhl. Ames.
On *Lathyrus venosus* Muhl. Decorah, Mason
City, Spirit Lake.
16. UROM. PYRIFORMIS Cke. 29th Rep. St. N. Y. Mus., p. 69.
III. On *Acorus calamus* L. Decorah.
17. UROM. RUDBECKIE Arthur and Holway (*n. sp.*)
III. Sori on the under surface of the leaf, compact, confluent into raised, mostly rounded, masses with a depressed center, naked, light brown; encircling epidermis obscure: telentospores elliptical to pear-shape, smooth, pale golden brown, 9 to 15^{mm} broad * by 20 to 30^{mm} long; wall thin; apex about 6^{mm} thick, narrowed into a broad obtuse point, or more rarely rounded, or broadly conical; base from narrow wedge-shape to broad and obtuse; pedicel rather broad but delicate, colorless, once to twice as long as the spores. Differs from *U. Solidaginis* Niessl. principally in the slenderer spores with less thickened and lighter colored apex.
On *Rudbeckia laciniata* L. Decorah.
18. UROM SPARGANII C. & P. 26th Rep. N. Y. St. Mus., p. 76.
II On *Sparganium eurycarpum* Engelm. Decorah.
III. On *S. eurycarpum* Engelm. Hancock Co., Decorah.
19. UROM TOXICODENDRI B. & R. Grev. III, p. 56. (II. *Pileolaria brevipes* B. & R.)
II. On *Rhus toxicodendron* L. Decorah, Ames, Spirit Lake.
III. On *R. toxicodendron* L. Decorah.
20. PUCCINIA AMORPHÆ Curtis. Grev., III, p. 55.
II. On *Amorpha fruticosa* L. Ames, Decorah, Spirit Lake.
III. { On *A. fruticosa* L. Decorah, Charles City, Ames,
On *A. canescens* Nutt. Ames, Decorah.
On *A. microphylla* Pursh. Spirit Lake.

* On account of the want of proper type, the abbreviation *mm* is used for Micromillimetre in place of the usual Greek letter. A Micromillimetre is .00001 of a Metre, and equals .0000394 of an inch, or about one twenty-five thousandths of an inch.

21. PUC. ANDROPOGI Schw. Syn. Fung. Am. Bor., No. 29 II.
(*P. ellisiana* Thm.)
III. { On *Andropogon furcatus* Muhl. Decorah, Charles
City, Spirit Lake.
On *A. scoparius* Michx. Ames, Decorah, Spirit Lake.
22. PUC. ANEMONES-VIRGINIANÆ Schw. Syn. Fung. Car. Sup., p.
46. (*P. solida* Schw.)
III. { On *Anemone cylindrica* Gr. Ames.
On *A. virginiana* L. Decorah, Charles City.
23. PUC. ANGUSTATA Peck. 25th Rep. N. Y. St. Mus., p. 123.
II. On *Cyperus strigosus*. Ames.
III. { On *C. strigosus* L. Ames.
On *Scirpus atrovirens* Muhl. Charles City, Ames,
Decorah, Spirit Lake.
On *Eriophorum polystachyon* L. Decorah.
24. PUC. ASTERIS Duby. Botan. Gallie., II, p. 888. (*P. asteris*.
Schw)
III. { On *Aster novæ-angliæ* L. Decorah.
On *A. azureus* Lindl. Ames.
25. PUC. ARUNDINARIÆ Schw. Syn. Fung. Car. Sup. No. 487.
III, On *Spartina cynosuroides* Willd. Ames, Charles City,
Ft. Dodge, Decorah, Spirit Lake.
The sori closely resemble those of *P. phragmitis*, but the spores
are very different, being in some respects more like those of *P.*
graminis. A very abundant species.
26. PUC. CALTHÆ Link. In Linnæus' Spec. Plant. VI, 2, p. 79.
On *Caltha palustris* L. Spirit Lake.
III. On *C. palustris* L. Decorah, Spirit Lake.
27. PUC. CARICIS (Schum.) Wint. Kryp. Fl. v. Deutschl., I, p. 222,
(*P. striola* Lk.)
III. { On *Carex strieta* Lam. Spirit Lake, Ames, Decorah.
On *C. adusta* Boott. Spirit Lake.
On *C. straminea* Schk. Spirit Lake.
28. PUC. CIRCÆÆ Pers. Dispos. method., p. 39.
III. On *Circæa lutetiana* L. Decorah, Ames.
29. PUC. CONVULVULI (Pers.) Winter. Krypt. Fl. v. Deutschl., I,
p. 204. (*P. convolvuli* B. & C.)
III. On *Convolvulus sepium* L. Decorah, Ames.
30. PUC. CORONATA Cda. Icones I, p. 6.

- III. { On *Avena sativa* L. Ames, Spirit Lake, Decorah.
 { On *Phalaris arundinacea* L. Decorah.
 { On *Cinna arundinacea* L. Ames.

31. PUC. CRYPTOTÆNIÆ Peck. 23d Rep. N. Y. St. Mus., p. 56.

III. On *Cryptotaenia canadensis* DC. Decorah.

32. PUC. CYPRIPEDI Arthur and Holway (*n. sp.*)

II. Sori round, flattened, scattered on the under surface of the leaf, brown, naked; encircling epidermis noticeable; uredospores round to elliptical, sparsely echinulate with low blunt points, rather dark brown, 14 to 18^{mm} broad by 17 to 22^{mm} long.

III. Sori scattered over the under surface of the leaf; rounded, cushion-shape, black, polished; encircling epidermis rather inconspicuous; teleutospores oblong or oblong-obovate, smooth, constricted in the middle, brown, 16 to 18^{mm} broad by 30 to 42^{mm} long; wall rather thin; apex strongly thickened, flattened, rounded, or obtuse, 6 to 10^{mm} thick; base obtuse or more rarely acute; pedicel as long or shorter than the spore, delicate, colorless.

On *Cypridium pubescens* Willd. Decorah.

33. PUC. DAYI Clinton. 28th Rep. N. Y. St. Mus., p. 61.

III. On *Steirônema ciliatum* Rap. Decorah.

34. PUC. ELEOCHARIS Arthur (*n. sp.*)

II. Uredospores polygonal-globose to egg-shape, yellow, minutely and sparingly warty, 18 to 24^{mm} broad by 18 to 30^{mm} long.

III. Sori round or nearly so, scattered, raised, nearly black, long covered by the epidermis which splits lengthwise; teleutospores oblong-wedge-shape, slightly or not at all constricted at the middle, brown or blackish brown, 16 to 20^{mm} broad by 45 to 54^{mm} long; wall thin; apex considerably or not at all thickened, squarely or obliquely truncate, rounded, or rarely broad-cone-shape; base wedge-shape, or slightly inflated; pedicel thick, extremely short.

On *Eleocharis intermedia* Schul. Spirit Lake.

On *E. palustris* R. Br. Ames.

No uredosori were seen, and only a few urespores. The teleutospores on *E. palustris* have the apex thicker and more rounded, than on *E. intermedia*.

- PUC. EMACULATA Schw. Syn. Fung. Am. Bor., No. 2912. (P. graminis Pers., var. brevicarpa Peck.)
 III. On *Panicum capillare* L. Ames, Decorah.
36. PUC. FLOSCULOSORUM (A. & S.) Wint. Kryp. Fl. v. Deutschl. I, p. 206. (P. compositarum Schlecht., P. variabilis Grev.)
 II. { On *Taraxacum officinale* Weber. Charles City, Ames.
 { On *Troximon cuspidatum* Pursh. Decorah.
 III. { On *Tar. officinale* Weber. Charles City, Decorah, Ames.
 { On *Trox. cuspidatum* Pursh. Decorah.
 { On *Cnicus altissimus* Willd., var. *discolor* Gr. Decorah.
37. PUC. FUSCA (Rhelh.) Wint. Kryp. Fl. v. Deutschl., I, p. 199. (P. anemones Pers.)
 III. { On *Anemone nemorsa* L. Decorah.
 { On *A. patens* L. var. *nuttalliana* Gr. Decorah.
38. PUC. GALIORIUM Link. Spec. Plant., II, p. 76.
 III. { On *Galium aparine* L. Decorah.
 { On *G. boreale* L. Decorah.
 { On *G. concinnum* T. & G. Decorah, Ames.
39. PUC. GENTIANÆ (Strauss.) Wint. Kryp. Fl. v. Deutschl., I, p. 205.
 II. On *Gentiana quinqueflora* Lam., var. *occidentalis* Gr. Decorah.
 III. On *G. puberula* Michx. Ames, Plymouth Co., Decorah.
40. PUC. GERARDII Peck. 25th Rep. N. Y. St. Mus., p. 91.
 III. On *Aster paniculatus* Lam. Ames.
41. PUC. GRAMINIS Pers. Dispos. method., p. 39.
 II. { On *Avena sativa* L. Ames.
 { On *Triticum vulgare* Vill. Ames, Charles City.
 { On *Av. sativa* L. Ames, Spirit Lake.
 { On *T. vulgare* Vill. Ames.
 { On *Agrostis vulgaris* With. Decorah.
 III. { On *Ag. scabra* Willd. Spirit Lake.
 { On *Elymus canadensis* L. Spirit Lake.
 { On *Muhlenbergia mexicana* Trin. Ames, Decorah.

The form on *Muhlenbergia* differs somewhat from the others, but does not seem to merit specific description.

42. PUC. HYDROPHYLLI P. & C. 30th Rep. N. Y. St. Mus., p. 54.
III. On *Hydrophyllum virginicum* L. Decorah.
43. PUC. VERRUCOSA (Schultz.) Wint. Krypt. Fl. v. Deutschl., I, p. 166. (*P. hyssopi* Schw.)
III. On *Lophanthus nepetoides* Benth. Decorah.
44. PUC. LOBELLE Gerard. Bull. Buffalo Soc. Nat. Sci., I, p. 66. (*P. microsperma* B. & C.)
III. On *Lobelia syphilitica* L. Ames.
45. PUC. MENTHE Pers. Synops. Fung., p. 227.
II. { On *Monarda fistulosa* L. Charles City, Ames.
On *Pycnanthemum lanceolatum* Pursh. Spirit Lake.
III. { On *M. fistulosa* L. Charles City, Decorah, Ames.
On *P. lanceolatum* Pursh. Charles City, Decorah, Ames.
On *Mentha canadensis* L. Ames, Decorah,
46. PUC. NOLITANGERIS Cda. Icones IV, p. 439. (*P. argentata* Wint.)
II. On *Impatiens pallida* Nutt. Decorah.
III. On *I. pallida* Nutt. Decorah, Charles City.
47. PUC. OBSCURA Schroet. Nuovo Giorn. Botan. Ital., IX, p. 256.
II. On *Luzula campestris* DC. Emmet County.
48. PUC. OBTECTA Peck. 25th Rep. N. Y. St. Mus., p. 121.
II. On *Scirpus validus* Vahl. Decorah.
III. On *S. validus* Vahl. Charles City, Decorah, Ames.
49. PUC. PHRAGMITIS (Schum.) Wint. Kryp. Fl. v. Deutschl., I, p. 179. (*P. arundinacea* DC.)
III. On *Phragmites communis* Trin. Spirit Lake, Mason City.
50. PUC. PIMPINELLÆ (Strauss) Wint. Kryp. Fl. v. Deutschl., I, p. 212. (*P. osmorrhizæ* C. & P.)
II. On *Osmorrhiza longistylis* DC. Decorah.
II. { On *Osmorrhiza longistylis* DC. Decorah.
On *O. brevistylis* DC. Decorah.
51. PUC. PODOPHYLLI Schw. Syn. Fung. Car. Sup., No 489, (*P. aculaeta* Link.)
III. On *Podophyllum peltatum* L. Ames, Decorah.

52. PUC. POLYGONI-AMPHIBII Pers. Synop. Fung., p. 227.
 II. On *Polygonum hartwrightii* Gr. Ames.
 III. { On *P. hartwrightii* Gr. Charles City, Ames, Spirit Lake.
 { On *P. muhlenbergii* Wats. Charles City, Ames, Spirit Lake.
53. PUC. PROSERPINACE Farlow. Proc. Am. Acad., XVIII, p. 80.
 II. On *Proserpinaca palustris* L. Boone.
54. PUC. PRUNORUM Link. Spec. Plant., II, p. 82.
 III. { On *Prunus serotina* Ehr. Decorah, Ames.
 { On *P. americana* Mars. Decorah.
55. PUC. BUBIGO-VERA (DC.) Wint. Kryp. Fl. v. Deutschl., I, p. 212. (*P. straminis* Fekl.)
 II. On *Triticum vulgare* Vill. Ames.
 III. { On *T. vulgare* Vill. Ames, Decorah.
 { On *Elymus canadensis* L. Spirit Lake.
56. PUC. SILPHII Schw. Syn. Fung. Am. Bor., No. 2929.
 III. On *Silphium perfoliatum* L. Decorah, Ames.
57. PUC. MAYDIS Carrad. Giorn. di Fisca d. Brugn. VIII. (*P. sorghi* Schw.)
 III. On *Zea mays* L. Decorah, Charles City, Ames.
58. PUC. SPOROBOLI Arthur (*n. sp.*)
 II. Uredospores yellow, round, minutely roughened, 24 to 28^{mm} in diameter.
 III. Sori on the leaves and stem, oblong or linear, brownish black, early naked; encircling epidermis, not very conspicuous; teleutospores oblong to oblong-clavate, smooth, somewhat or not at all constricted in the middle, deep brown at least above, 15 to 21^{mm} broad by 28 to 45^{mm} long; apex thickened, semicircular to obtuse; base acutish, or less often obtuse; pedicel rather stout, as long or shorter than the spore, colored.
 On *Sporobolus heterolepis* Gr. Ames, Spirit Lake, Decorah.
 It is accompanied by, or it may be better to say that the host bears, one-celled teleutospores, which are sometimes produced in abundance without intermixture of the two-celled form. The description of the sori, and of the color, apex, base and pedicel of the two-celled form applies equally well to the one-celled, except that the pedicel still remains as long as the two-celled spore,

i. e. one to two and a half times the length of the one-celled spore. The one-celled spore is elliptical to oblong-clavate or, oblong-fusiform, or even obvate, 14 to 18^{mm} broad, by 18 to 24^{mm} long. The probability of its being an early state of the teleutospore form of the *Puccinia* of the same host, as we find in *P. verans* and *P. lantanae*, makes it undesirable to describe it as a *Uromyces*, and yet its relation to the two-celled form requires further confirmation.

59. PUC. SPRETA Peck. 29th Rep. N. Y. St. Mus., p. 67.

III. On *Mitella diphylla* L. Decorah.

60. PUC. STIPÆ Arthur (*n. sp.*)

II. Sori oblong, small, mostly on the upper surface of the leaf, yellowish, inconspicuous, tardily naked; uredospores yellow, round to oblong or ovate, minutely roughened and with or without very fine points, 15 to 20^{mm} broad by 20 to 30^{mm} long.

III. Sori oblong, scattered over the upper surface of the leaf, very dark brown, soon naked; encircling epidermis inconspicuous; teleutospores oblong or less commonly oblong-obovate, smooth, brown, considerably constricted at the middle, 18 to 25^{mm} broad by 42 to 56^{mm} long; apex thickened, or sometimes thin, rounded to obtuse, sometimes acutish; base obtuse or somewhat narrowed; pedicel slightly colored, two to three times as long as the spore.

On *Stipa spartea* Trin. Ames.

61. PUC. TANACETI DC. Flore Franc., II, p. 222. (*P. helianthi* Schw.)

II. { On *Helianthus strumosus* L. Charles City.

{ On *Vernonia fasciculata* Michx. Ames.

{ On *H. strumosus* L. Charles City, Decorah.

{ On *H. tuberosus* L. Ames, Charles City.

{ On *H. grosse-serratus* Mart. Ames.

{ On *H. maximiliani* Schrad. Spirit Lake.

{ On *H. occidentalis* Rid. Decorah.

III. { On *H. rigidus* Desf. Ames, Spirit Lake.

{ On *V. fasciculata* Michx. Decorah, Ames.

{ On *V. noveboracensis* Willd. Creston.

{ On *Artemisia ludoviciana* Nutt. Decorah, Charles City.

{ On *A. dracunculoides* Pursh. Charles City.

62. *PUC. THALICTRI* Chev. Flor. Paris., I, p. 417.
 III. On *Thalictrum dioicum* L. Ames.
63. *PUC. VERONICÆ* (Schum.) Wint. Kryp. Fl. v. Deutschl., I, p. 166. (*P. veronicarum* DC.)
 III. On *Veronica virginica* L. Ames.
64. *PUC. VEXANS* Farlow. Proc. Am. Acad., XVIII, p. 82.
 III. { On *Bouteloua racemosa* Lag. Decorah, Spirit
 { Lake.
 On *Sporobolus cuspidatus* Torr. Spirit Lake.
65. *PUC. VIOLE* DC. Flore Franc., VI, p. 62.
 II. On *Viola cucullata* Ait. Decorah.
 III. { On *V. cucullata* Ait. Decorah.
 { On *V. pubescens* Ait. Decorah.
66. *PUC. XANTHII* Schw. Syn. Fung. Car. Sup., No. 500.
 III. On *Xanthium canadense* Mill. Decorah, Ames, Spirit Lake.
67. *PUC. ZYGADENI* Trelease. Trans. Wis. Acad. Sci. VI.
 III. On *Zygadenus elegans* Pursh. Decorah.
68. *PHRAGMIDIUM GRACILE* (Farlow). *P. incrassatum* Lk. var. *gracile* Far., in Ellis' N. Am. Fungi, III, No. 282.
 I. *Æcidia*, round, small, sparingly scattered over the upper surface of the leaf, soon naked, yellow; spores in short chains from round to oblong, elliptical or ovate-spatulate, with thick wall and uneven surface, moderately echinulate with conical points, 12 to 20^{mm} broad by 16 to 24^{mm} long; paraphyses slender club-shape, strongly curved, colorless.
 II. Not seen.
 III. Sori rather small, round, on the under surface of the leaf, scattered, or loosely aggregated and confluent, black; teliospores cylindrical, warty, dark opaque brown, of 4 to 9 cells, mostly 7 to 9, 30^{mm} broad by 75 to 100^{mm} long; apex abruptly narrowed into a prominent, colorless, obtuse point; pedicel colorless, thick, swollen in the lower half, one and a half times the length of the spore, the outer portion bursting when placed in water.

On *Rubus strigosus* Michx. Decorah.

This species as closely resembles the European *P. rubi-idaei* (Pers.), the *P. gracile* of Cooke's Handbook, as the

American host resembles the European one. It differs chiefly in the slightly smaller spores, different disposition of the æcidia, and the characteristic apex of the teliospores.

69. *PHRAG. OBTUSUM* (Strauss) Wint. Kryp. Fl. v. Deutschl., I, p. 229.

II. On *Potentilla canadensis* L. Decorah.

III. On *P. canadensis* L. Charles City.

70. *PHRAG. SPECIOSUM* (Fr.) Aregma speciosum Fr., in Syst. Mycol., III, p. 496. (I. *Uredo miniata* Pers.)

I. *Æcidia* orange yellow, of various forms, usually confluent forming elongated swollen spots, often 12^{mm} long, on the stems and leaf-veins of the present year's growth, considerably bending and distorting them, or on the mesophyll of the leaf becoming small and roundish, early naked; encircling epidermis nearly white, conspicuous; spores in short chains, roundish to oblong, angular, minutely granular, somewhat eniculate, with thin walls, yellow, 16 to 24^{mm} broad by 20 to 30^{mm} long; paraphyses few, club-shape, nearly straight, colorless.

II. Not seen.

III. Sori longer than broad, mostly confluent, on swollen stems of previous year's growth, at first compact, finally felt-like black; teliospores cylindrical, very dark brown, smooth, of 5 to 8 cells, mostly 7, 24 to 28^{mm} broad by 66 to 102^{mm} long; apex rounded or acutish, or more generally narrowed into a conical-obtuse, nearly colorless point; pedicel two to four times the length of the spore, colorless, tapering downwards.

On *Rosa blanda* Ait. Ames, Decorah, Charles City.

71. *PHRAG. SUBCORTICIUM* (Schränk) Wint. Kryp. Fl. v. Deutschl., I, p. 228. (*P. mucronatum* Lk.)

II. On *Rosa blanda* Ait. Spirit Lake.

III. On *R. blanda* Ait. Decorah, Ames, Spirit Lake.

72. *GYMNOSPORANGIUM CLAVARIEFORMIS* DC. Flore Franc., II, p. 217.

III. On *Juniperus communis* L. Decorah.

73. *GYM. CLAVIPES* C. & P. 25th Rep. N. Y. St. Mus., p. 89.

III. On *Juniperus virginiana* L. Decorah.

74. *GYM. MACROPUS* Lk. Spec. Plant., VI, p. 128.
 III. On *Juniperus virginiana* L. Decorah, Charles City, Ames.
75. *MELAMPSORA POPULINA* (Jacq.) Wint. Kryp. Fl. v. Deutschl., I, p. 238.
 II. { On *Populus balsamifera* L. Charles City.
 { On *P. monilifera* Ait. Charles City, Ames.
 III. { On *P. balsamifera* L. Charles City.
 { On *P. monilifera* Ait. Charles City.
76. *MEL. SALICINA* Lev. Ann. Sci. Nat., VIII, p. 375.
 II. { On *Salix amygdaloides* Anders. Ames.
 { On *S. longifolia* Muhl. Charles City.
77. *COLEOSPORIUM SONCHI-ARVENSIS* (Pers.) Wint. Kryp. Fl. v. Deutschl., I, p. 237. (*C. solidaginis* Thm.)
 II. { On *Aster cordifolius* L. Ames.
 { On *A. drummondii* Lindl. Charles City, Ames.
 { On *Callistephus chinensis* Ness. Ames.
 { On *Silphium laciniatum* L. Ames.
 { On *Solidago canadensis* L. Charles City, Ames, Spirit Lake.
 { On *S. serotina* Ait. Spirit Lake.
 III. { On *S. canadensis* L. Ames.
 { On *S. Nemoralis* L. Ames.
78. *COL. VIBURNI* Arthur (*n. sp.*)
 II. Sori irregular shape, at first blister-form, becoming flattened, scattered over the under surface of the leaf, or gathered into indefinite groups, sometimes coalescing into circles, orange yellow; uredospores nearly round, or irregularly oblong, finely and thickly warty, pale yellow, 18 to 25^{mm} broad by 22 to 30^{mm} long.
 On *Viburnum lentago* L. Charles City.
 The specimens were gathered in September, and no teleutospores had yet begun to form. The uredospores germinate with the greatest readiness, even while still in the sorus.
79. *CHRYSOMYXA PIROLATUM* (Koern) Wint. Krp., Fl. v. Deutschl.
 II. On *Pyrola elliptica* Nutt. Decorah.

UNDISTRIBUTED FORMS.

80. *UREDIO AGRIMONIÆ* (DC.)

On *Agrimonia eupatoria* L. Charles City, Ames.

81. *UR. BOUTELOUÆ* Arthur (*n. sp.*)

Sori on the upper surface of the leaf, seated on yellow spots, small, yellow, elliptical or oblong, irregularly scattered, tardily naked; encircling epidermis inconspicuous, spores round, oblong or elliptical, rarely ovate, very minutely and sparingly echinulate, or quite smooth, orange yellow, 15 to 25^{mm} broad by 20 to 30^{mm} long; wall very thin; paraphyses numerous, intermixed with the spores, slender club-shape with slight constriction near the upper end, varying to capitate with a thick stalk, colorless, with thick walls and rounded apex, 13^{mm} broad at the upper end by 38 to 75^{mm} long.

On *Bouteloua racemosa* Lag.

The above description was given in Bull. Minn. Acad. Nat. Sci., II, where the plant was assumed to be the uredo stage of *Uromyces brandegei* Pk., a puzzling species, and as no teleutospores have been found in connection with the uredo, it is probably best to treat it separately until further developments.

82. *UR. IRIDIS* Duby.

On *Iris versicolor* L. Decorah.

83. *UR. POLYPODII* (Pers.) (*Uredo filicum* DC.)

On *Pellaea gracilis* Hook. Decorah.

84. *CÆOMA LUMINATUM* Schw.

On *Rubus villosus* Ait. Decorah, Charles City.

85. *ÆCIDIIUM ACTÆÆ* Wallr.

On *Actæa alba* L. Decorah, Charles City.

86. *ÆC. ALBESCENS* Grev.

On *Adoxa moschatellina* L. Decorah, Charles City.

87. *ÆC. ASTERATUM* Schw.

On *Aster cordifolius* L. Ames.

88. *ÆC. BERBERIDIS* Gmel.

On *Berberis vulgaris* L. Charles City, Chickasaw Co., Decorah, Ames.

89. *ÆC. CALADII* Schw.
 On *Arisæma dracontium* Schott. Manchester, Ames.
 On *A. triphyllum* Torr. Charles City, Manchester.
90. *ÆC. PENTSTEMONIS* Schw.
Æcidia small, loosely gathered in mostly small irregular groups on both surfaces of the leaves; margin delicate, white, erect, nearly entire; spores polygonal-globose, smooth, yellow, 16 to 22^{mm} in diameter.
 On *Castilleia sessiliflora* Pursh. Ames.
 On *C. coccinea* Spreng. Decorah.
91. *ÆC. CLEMATIDIS* DC.
 On *Clematis virginiana* L. Decorah.
92. *ÆC. COMPOSITARUM* Mart.
 On *Helianthus strumosus* L. Decorah, Ames.
 On *Rudbeckia laciniata* L. Decorah.
 On *Senecio aureus* L. Decorah.
 On *Silphium laciniatum* L. Ames.
 On *Sil. perfoliatum* L. Ames, Decorah.
 On *Solidago latifolia* L. Ames.
 On *Sol. rigida* L. Decorah.
 Following the suggestion of Dr. Winter (Kryp. Fl. v. Deutschl., I, p. 264), all of our *æcidia* on *Compositæ* which are not suitably provided for are placed here. *Æcidia* have been gathered on several species of *Lactuca* and *Nabalus*, but as the hosts have not been carefully determined, the localities are omitted, hoping that better material may be collected hereafter.
93. *ÆC. CONVALLARIÆ* Schw.
 On *Polygonatum giganteum* Diet. Decorah, Ames.
 On *Uvularia grandiflora* Smith. Ames.
94. *ÆC. CRASSUM* Pers.
 On *Rhamnus alnifolia* L'Her. Decorah.
 On *R. lanceolata* Pursh. Boone Co.
95. *ÆC. CYPARISSIÆ* DC.
 On *Euphorbia commutata* Engelm. Decorah.
96. *ÆC. EPILOBII* DC.
 On *Oenothera biennis* L. Decorah, Ames, Spirit Lake.
97. *ÆC. ERIGERONATUM* Schw.
 On *Erigeron strigosus* Muhl. Decorah.
 On *E. philadelphicus* L. Ames.

98. *ÆC. EUPHORBIÆ* (Schw.)
 On *Euphorbia heterophylla* L. Decorah.
 On *E. maculata* L. Ames, Charles City.
99. *ÆC. FRAXINI* Schw.
 On *Fraxinus viridis* Michx. f. Ames, Spirit Lake.
100. *ÆC. GALII* Pers.
 On *Galium concinnum* T. & G. Decorah.
101. *ÆC. GERANII* DC.
 On *Geranium maculatum* L. Decorah, Ames.
102. *ÆC. GROSSULARIÆ* DC.
 On *Ribes cynosbati* L. Manchester.
 On *R. floridum* L. Charles City, Ames.
 On *R. gracile* Michx. Decorah, Charles City, Ames.
103. *ÆC. HEPATICATUM* Schw.
 On *Anemone acutiloba* Law. Decorah.
104. *ÆC. HYDNOIDEUM* B. & C.
 On *Dirca palustris* L. Decorah.
105. *ÆC. HYDROPHYLLI* Pk.
 On *Ellisia nyctelea* L. Decorah.
 On *Hydrophyllum virginicum* L. Ames.
106. *ÆC. HYPERICATUM* Schw.
 On *Hypericum pyramidatum* Ait. Decorah.
107. *ÆC. IMPATIENTATUM* Schw.
 On *Impatiens fulva* Nutt. Decorah.
 On *I. pallida* Nutt. Decorah, Ames, Spirit Lake.
108. *ÆC. IRIDIS* Ger.
 On *Iris versicolor* L. Decorah.
109. *ÆC. JAMESIANUM* Pk.
 On *Asclepias cornuti* Dec. Decorah.
 On *A. tuberosa* L. Decorah.
110. *ÆC. LEGUMINOSATUM* Lk.
 On *Amphicarpæa monoica* Nutt. Decorah.
 On *Apios tuberosa* Moench. Ames.
111. *ÆC. MENTHÆ* DC.
 On *Monarda fistulosa* L. Decorah.
112. *ÆC. NAPÆÆ* Arthur and Holway (*n. sp.*)
 Æcidia in orbicular groups on under surface of the leaf, on
 small yellow spots; margin prominent, white, re-
 curved, with large and small lobes; spores nearly roun-
 varying to oblong and oval, nearly colorless, smooth,

or under high power minutely corrugated in places
15 to 18^{mm} broad by 16 to 22^{mm} long.

- On *Napæa dioica* L. Decorah.
113. *ÆC. CENOTHERÆ* Pk.
On *Cenothera biennis* L. Decorah.
On *C. serrulata* Nutt. Ames.
114. *ÆC. OROBI* DC.
On *Trifolium repens* L. Decorah.
115. *ÆC. OXALIDIS* Thm.
On *Oxalis violacea* L. Ames.
The spores are a little smaller than those of the type specimens, which were collected at the Cape of Good Hope, but otherwise seem to be the same.
116. *ÆC. PERICLYMENI* Schum.
On *Lonicera sullivantii* Gr. Decorah.
117. *ÆC. PHLOGIS* Pk.
On *Phlox divaricata* L. var. *laphamii* Wd. Decorah, Ames.
On *P. pilosa* L. Ames.
118. *ÆC. PIMPINELLÆ* Kirchr. (*Æ. osmorrhizæ* Pk.)
On *Osmorrhiza longistylis* DC. Decorah.
On *Cicuta maculata* L. Decorah.
119. *ÆC. PODOPHYLLI* Schw.
On *podophyllum pelatum* L. Decorah, Ames.
120. *ÆC. POLEMONII* Pk.
On *Polemonium reptans* L. Decorah.
121. *ÆC. POLYGALINUM* Pk.
On *Polygala senega* L. Decorah.
122. *ÆC. POROSUM* Pk.
On *Lathyrus venosus* Muhl. Decorah.
On *Psoralea argophylla* Pursh. Decorah.
On *Vicia americana* Muhl. Decorah, Ames.
123. *ÆC. PUNCTATUM* Pers. (*Æ. quadrifidum* DC.)
On *Anemone nemorosa* L. Ames.
124. *ÆC. PUSTULATUM* Curt.
On *Comandra umbellata* Nutt. Decorah, Ames.
125. *ÆC. RANUNCULACEARUM* DC.
On *Anemone dichotoma* L. Decorah.
On *A. nemorosa* L. Decorah.
On *A. virginiana* L. Decorah.
On *Isopyrum biternatum* T. & G. Decorah.

These several æcidia are associated under this name for want of a better way of disposing of them, although it is probable that none of them are identical with the true *Æ. ranunculacearum* of DeCandolle. The one on *Anemone virginiana* is accompanied by *Puccinia anemones-virginianæ*.

126. *ÆC. RANUNCULI* Schw.
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127. *ÆC. SAMBUCI* Schw.
On *Sambucus canadensis* L. Ames.
128. *ÆC. TENUE* Schw.
On *Eupatorium perfoliatum* L. Decorah.
On *E. purpureum* L. Spirit Lake.
129. *ÆC. THALICTRI* Grev.
On *Thalictrum cornuti* L. Decorah.
130. *ÆC. URTICÆ* Schum.
On *Urtica gracilis* Ait. Decorah.
131. *ÆC. VIOLÆ* Schum.
On *Viola cucullata* Ait. Decorah, Ames.
On *V. delphinifolia* Nutt. Ames, Decorah.
On *V. pedata* L. Ames, Decorah.
On *V. pubescens* Ait. Decorah.
132. *ÆC. XANTHOXYLI* Pk.
On *Xanthoxylum americanum* Mill. Decorah.
133. *RÆSTELIA LACERATA* Fr.
On *Cratægus subvillosa* Schrad. Charles City.
On *C. tomentosa* L. Charles City.
134. *RÆS. PENICILLATA* Fr.
On *Pirus coronaria* L. Ames, Charles City, Des Moines.
N. Y. Agri. Exper. Station; Geneva, N. Y., Oct. 30, 1884.

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MEMORANDUM OF IOWA USTILAGINEÆ.

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BY J. C. ARTHUR.

The following list of species found within the state will serve as a memorandum to collectors. Owing to want of time it has been impossible to work up all the material on hand, or to always give the most approved synonymy.

Each locality is represented by one or more specimens, mostly in the herbarium of the Iowa Agricultural College.

Thanks are due Professor C. E. Bessey and Mr. E. W. Holway for the contribution and loan of specimens.

## USTILAGO BISTORTARUM (DC.)

On Polygonum incarnatum Ell. Ames.

## UST. CANDOLLEI Tul.

On Polygonum sagittatum L. Charles City.

## UST. CARICIS (Pers.) (U. urceolorum Tul.)

On Carex pennsylvanica Lam. Spirit Lake.

## UST. DESTRUENS Duby.

On Panicum capillare L. Ames.

On P. glabrum Gaud. Charles City.

The spores of American specimens are not smooth but more or less rough and reticulated.

## UST. HYPODYTES (Schlecht)

On Elymus canadensis L. Ames.

## UST. JUNCIS Schw.

On Juncus tenuis Willd. Ames.

## UST. ZEE-MAYS (DC.) Winter. (UST. MAYDIS DC.)

On Zea mays L. Ames, Charles City.

UST. MINIMA Arthur (*n. sp.*)

Spores roundish, either isodiametric or irregularly oblong or ovate, light brown, transparent, smooth, 3 to  $4\frac{1}{2}$  mmm in diameter.

In the inflorescence of Stipa spartea Trin. Ames.



## UST. NEGLECTA Niessl.

On *Setaria glauca* Beauv. Ames. Decorah, Charles City.

UST. ROTUNDATA Arthur (*n. sp.*)

Spores exactly round, or irregularly roundish, yellowish to dark brown, translucent, finely and closely papillate, 20 to 25<sup>mm</sup> in diameter; epispore very thick.

In the ovaries of *Panicum virgatum* L. Harrison Co.

This species converts the ovaries into a brown pulverulent mass, but does not affect the external appearance of the flowers or the development of the panicle.

## UST. SEGETUM (Bull) (U carbo DC.)

On *Arrhenatherum avenaceum* Beauv. Ames.

On *Avena sativa* L. Spirit Lake.

On *Hordeum vulgare* L. Decorah.

On *Triticum vulgare* Vill. Ames.

## UST. SPERMOPHORUS B. &amp; C.

On *Eragrostis poaeoides* Beauv., var. *megastachya* Gr. Decorah, Charles City, Ames.

## UST. SYNTHESISMÆ Schw.

On *Cenchrus tribuloides* L. Charles City.

## UST. UTRICULOSA (Nees.)

On *Polygonum hydropiper* L. Charles City.

On *P. incarnatum* Ell. Ames, Charles City, Decorah.

On *P. pennsylvanicum* L. Ames, Charles City.

## SOROSPORIUM BULLATUM Schr.

On *Panicum crus galli* L. Ames, Charles City.

## TILLETIA TRITICI (Bjerk) Winter (T. caries Tul.)

On *Triticum vulgare* Vill. Ames.

A form with smooth spores sometimes occurs, but as it is often intermixed with the rough spored form, it is doubtless only a state of the latter.

## THECAPHORA ATERRIMA Tul.

On *Carex adusta* Boott. Ames.

## ENTYLOMA BESSEYI Farl.

On *Physalis virginiana* Mill. Charles City, Ames, Decorah.

On *Solanum nigrum* Linn. Ames.

## ENT. COMPOSITARUM Farl.

On *Lepachys pinnata* T. & G.

## ENT. MENISPERMI Farl. &amp; Trel.

On *Menispermum canadense* L. Decorah.

ENT. MICROSPORUM (Ung) BeBy.

On *Ranunculus repens* L. Decorah.

DOASSANSIA ALISMATIS Cornu.

On *Alisma plantago* L., var. *americanum* Gr. Decorah.

UROCYSTIS ANEMONES (Pers.) (U. *pompholygodes* Rabh.)

On *Anemone acutiloba* Law. Ames.

On *A. nemorosa* L. Decorah.

UROC. COLCHICI (Schl) Wint.

On *Polygonatum giganteum* Diet. Decorah.

UROC. OCCULTA (Wallr.) Wint.

On *Elymus canadensis* L. Ames, Decorah.

*N. Y. Agric. Exper. Station, Geneva, N. Y., Oct. 30, 1884.*



